

ONTARIO WATER RESOURCES COMMISSION

1970 cottage pollution control  
program Sparrow Lake.

1971.

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ONTARIO WATER RESOURCES COMMISSION

ONTARIO DEPARTMENT OF HEALTH

1970 COTTAGE POLLUTION CONTROL PROGRAM

SPARROW LAKE

Based on recommendations of the March, 1970 report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, interdepartmental field surveys of Sparrow Lake located on the District Municipality of Muskoka - County of Simcoe boundary were conducted during 1970.

During the summer, staff of the Ontario Department of Health's Public Health Engineering Service performed investigations of on-shore private sewage disposal systems located in the District Municipality of Muskoka. A map showing the location of those systems which were found to be polluting or causing a public health nuisance is appended. Corrections are being carried out on these faulty systems. A detailed report on the work completed to March 31, 1971, is scheduled to be published in the near future.

Staff of the Ontario Water Resources Commission's District Engineers Branch conducted water quality studies during the period of July 10 to 14 and September 28 to October 1, 1970.

The geometric mean densities respecting total and fecal coliform bacteria (see appended map) met the OWRC criteria for total body contact recreational use. The maximum geometric mean densities were 447 total coliforms per 100 ml and 93 fecal coliforms per 100 ml. The survey also indicated that fecal contaminants

were flushed into the lake from the lake environs during the July rain or shortly thereafter; this caused the fecal coliform count to exceed 100 organisms per 100 ml at stations in the Port Stanton area, north of Grandview Point and along the east shore at that time. High geometric mean densities of fecal streptococcus organisms (see map) were found at most stations but these levels were indicative of natural-type pollution.

Thermal stratification, a natural occurrence in many lakes, was observed during the summer in Deep Bay only. Below the zone of rapid temperature change (or thermocline), the dissolved oxygen content was below that required by the OWRC. The absence of thermal stratification during 1970 in the main body of the lake may have been due to the relatively short retention time and high flow preventing its development or persistence, even in deep water. Probably morphometry, depth and wind action also had a significant part to play in preventing thermal stratification. Deep Bay was an exception, apparently due to its depth and sheltered nature.

The chemical water quality was uniform throughout the lake during the summer survey. The fall survey showed that the Kakshe River had a generally lower mineral content than did the Severn River water; this is attributed to the fact that Kakshe River drains a Precambrian Shield area whereas the Severn River also drains other geological terrain. Changes in the mineral quality during the fall survey as compared to the summer survey reflected the influence of the Severn River, the main inflow. The hardness of the water generally varied from 95 to 110 ppm which is about two-thirds that of Lake Ontario.

## BACTERIOLOGICAL INDICATOR ORGANISMS

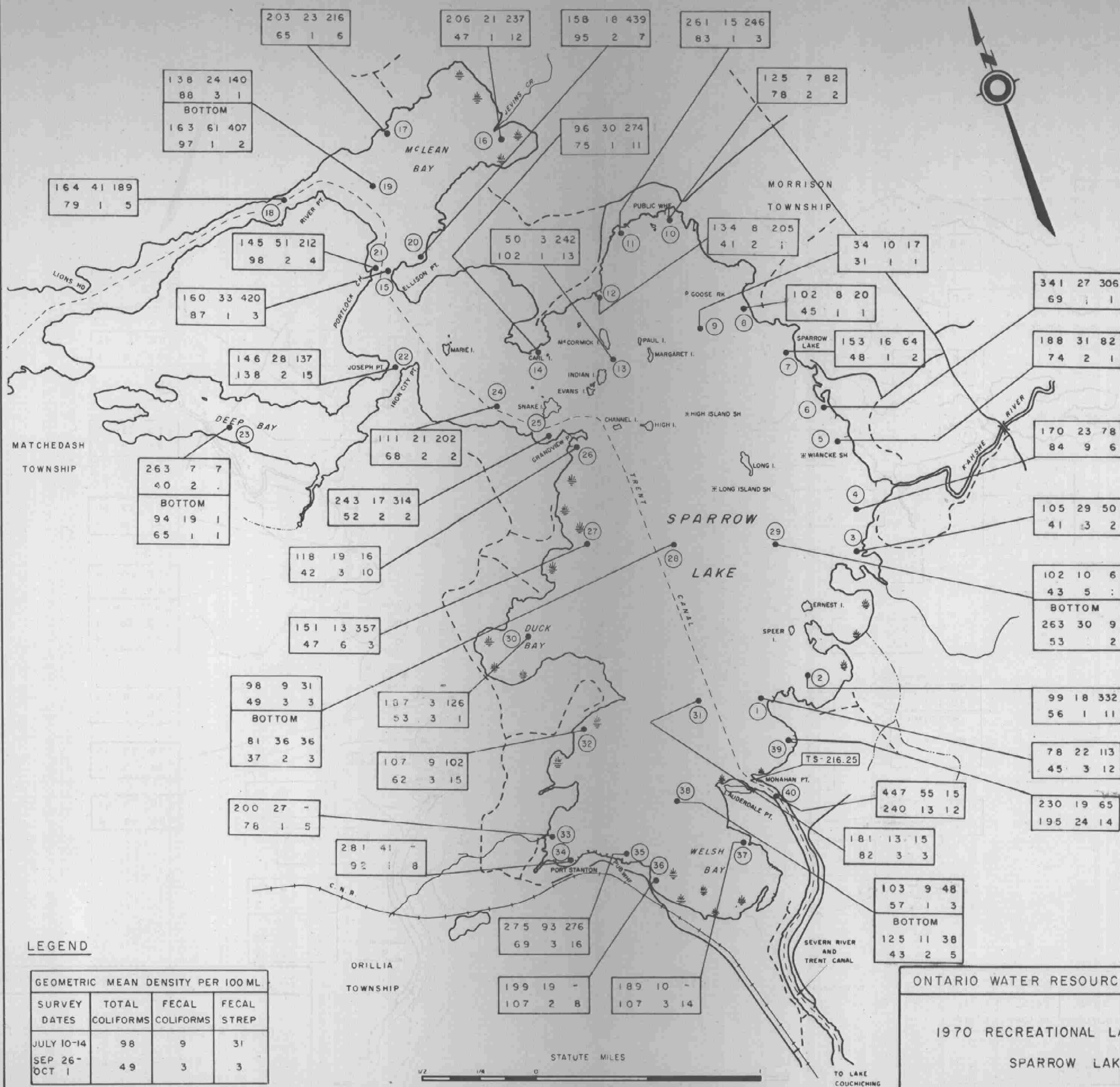
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.



ONTARIO WATER RESOURCES COMMISSION

1970 RECREATIONAL LAKES PROGRAM

SPARROW LAKE

SCALE: AS SHOWN

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